

Edit DVB recordings and burn them on DVD easy, fast and at no cost

(DVB = digital video broadcasting = digital television)

Advantages of this method:

- easy to understand even for newbees
- extremely fast because video data is only copied and hasn't to be re-encoded
- no need for commercial software
- the freeware utilities are very small in spite of their professional functionality (results in short download times)
- the freeware tools are subject to constant optimisation; with no cost you can stay up-to date (download times and costs are negligible)
- audio and video stay in perfect sync even under bad transmission conditions with significant error rates (e.g. bad weather)! Such transmission errors usually make commercial software crash during the authoring process

The only disadvantage of this method:

- as of today, there's no possibility of adding DVD menus (which is not too hard to accept as there weren't any menus on VHS cassettes; on the other hand you get top quality without commercials)

Required software:

PVAstrumento - freeware by Wiljo Heinen (www.offeryn.com), 669 kB zipped, current vers. 2.1.0.13; in case of any demux problems - especially dealing with AC3-streams - try vers. 2.1. RC 4)

Cuttermaran - freeware by Tobias Arnold (<http://cuttermaran.kickme.to>), 816 kB zipped, current vers. 1.62, requires Microsoft .netFramework 1.1)

• **IfoEdit** - freeware, 445 kB zipped, current vers. 0.971)

• **VobEdit** - freeware, 88 kB zipped, current vers. 0.6)

• **DVD burning software**

Overview			
time needed for conversion processes and burning: appr. 40 min./movie (with P4 @ 2,5 GHz)			
	process	software	time (for 1,5 h of film)
1.	demux MPEG file(s) (into video and audio stream; necessary for transmission error correction)	PVAstrumento	appr. 6 min.
2.	cut and merge demuxed MPEG file(s); optional: add 4 sec. of black leader	Cuttermaran	appr. 7 min.
3.	remux video and audio streams; results in a burn-ready set of VOB, IFO and BUP files	IfoEdit	appr. 7 min.
4.	burn material on DVD (or CD-R(W) = miniDVD)	burning software	appr. 15 min. for 4,7 GB

PC performance optimization:

One can considerably increase performance by muxing/demuxing between two physical hard drives! Process speed is doubled: demux from drive 1 to drive 2; cut from drive 2 back to drive 1; remux from drive 1 back to drive 2 again.

Important notice:

Today, unauthorized copying of digital data causes enormous damage to media enterprises and artists. As the author of this guide I've paid greatest attention to the fact that my method works with cost-free, freely available and legal software. The method describes the treatment of legal private TV recordings. As far as I know as of the day of the writing of this guide, my method complies with the media copying laws. If there's a software used in my guide which does NOT comply with the demands please let me know so I can remove it immediately.

The only intention of this writing is to help DVB card users to cut their mpeg files and burn them onto a DVD. In no way I want to promote illegal acts or the use of illegal software!

GUIDE

Everybody who uses his computer in conjunction with a PCI **DVB** card as a digital VCR wants to cut out annoying commercials and put his recordings on a DVD. There is a number of guides in the internet describing how to accomplish this but unfortunately most results suffer from troubles with audio/video sync. The following guide, applicable even for "newbees", is easy and fast at the same time and has proven its reliability in various tests.

You can cut out the commercials from a DVB recording and put it onto a DVD in much less than an hour (using a PentiumIV @ 2,5 GHz).

Step 1 – demuxing with PVAStrumento

The DVB recording has to be demuxed first using PVAStrumento. This will split the interleaved MPEG transport stream data into separate video and audio files. One reason to do this is that following DVD authoring software has to be fed with separate input streams. The second reason is that PVAStrumento will fix errors that might have accured during transmission via satellite.

Open up your DVB MPEG recording in PVAStrumento. Then click DEMUX.

You now have to define an output directory in the DEMUX tab and set the MPEG file's extension to m2v. This will help the following programs to easier find the demuxed files. Now click START and let PVAStrumento begin the demux/fix process. Afterwards click on INFO and note down the properties of the audio stream. You will probably need this data in the next step when you add a black 4-second-leader to the film.

Step 2 – cut/merge films with Cuttermaran

First, let's prepare Cuttermaran to be able to cut on any frame (not only on I-frames). Get [CuttyEnc.zip](#) and [dvdauthor-0.6.9](#) package and extract the files to the following locations:

- put [CuttyEnc.dll](#) into Cuttermaran program folder
- put [CuttyEnc.resources.dll](#), [CuttyEncProvider.configuration.xml](#), [Mpeg2Enc.exe](#) and [cygwin1.dll](#) into Cuttermaran's \Provider\encode subdirectory
- launch Cuttermaran and choose menu ACTIONS and then SETTINGS ...
- open the ENCODING tab and engage the encoding mode
- from the encoder drop down menu choose Mpeg2Enc and click on CONFIGURE
- doubleclick on the grey line and define Mpeg2Enc.exe's location
- finally click SAVE

From now Cuttermaran can perform cuts on any frame.

Launch Cuttermaran and open 4 sec black leader.m2v. Several correspondent audio streams will automatically be loaded as well. You just need one of them - the one that matches the stream properties of the film's audio stream. So delete all other streams from the list. Now, press the SET CUT IN button and pull the slider below the previews as far to the right as possible. Click SET CUT OUT and then on ADD RANGE TO CUT LIST. You just added a 4 second black leader to the cutlist.

Now, open the (first) m2v video part of your film. The file will be scanned and then previewed in the right program window. The audio part will automatically be loaded as well as long as Cuttermaran finds it in the same directory as the video part (which normally is the case). Use the slider underneath the previews to coarsely define the first cutting position (which will be the IN point of the film portion to be kept) and justify the exact position by clicking on the I-frame button right beside the right preview (normally the program can only cut on I-frames; if you installed the free MPEG2Enc.exe encoder and CuttyEnc file compilation it can cut on P- or B-frames also).

Once the exact frame to cut on has been found click on SET CUT IN. Continue in the same manner to define the OUT point of the video portion to be kept and click on SET CUT OUT. Then, click on ADD RANGE TO CUT LIST.

Proceed accordingly to create your complete cut list. It is possible to add excerpts from other films as long as their media parameters match those of the first video file (frame rate, aspect ratio, dimension and audio format). The takes in the cutlist can be reordered using the arrow buttons next to the cut list. Cuttermaran displays the amount of inevitable sync offset between audio and video but perfectly manages not to exceed an imperceptible amount of offset (usually +/- 8ms).

You can control cut transitions anytime by clicking on PREVIEW. The small drop down menu permits to select a transition to be previewed. You can define pre/post roll time of the transition preview in the options. During transition preview you could eventually notice a/v sync offset which will NOT occur in the final output file. Of course, the preview function does its job in revealing any optical transition problems.

Once all cuts have been defined you should save your project file (this saves only the cut list data). Then click on CUT VIDEO/AUDIO to engage the real cutting process. Choose a destination for the output file. It's highly recommended to save it to a second physical hard drive to speed up the process by a factor of 2. Cuttermaran will take some time to complete copying the data to the new file. No re-rendering is performed, so picture and sound quality stay exactly the same and calculation time is extremely short. As a result you'll get new demuxed audio and video files.

In my tests Cuttermaran always created perfect transitions at the cut points without any glitches in audio/video sync even with long films (most other software – even commercial ones – didn't accomplish this). In case a film consists of more than one DVB file (e.g. a movie recorded in several portions with fragments of commercials in them), I suggest to load all of the demuxed files into Cuttermaran one after the other (load file – make cut list – load next file – add edits to cut list ...) and merge them all together into just one single output file. This means that IfoEdit will only have to run once to accomplish DVD authoring later on.

Step 3 – add chapters to your DVD

To add chapters to your video (or skip points to make navigation easier) you have to create a simple text file called CellTimes.txt with notepad. Every chapter is represented by a new text line showing the frame number it begins with. If, for example, you'd like to insert skip points every 5 min. repeatedly you'll have to make up a text file like this (25 frames/sec. x 60 sec. x 5 = 7500 frames/5 min.):

```
7500
15000
22500
30000
37500
45000
...
225000
232500
240000
```

The list above will put chapter marks in 5 min. intervals into your video (last at 160 min.). NOTE: Be sure to add a blank line after the last number (240000 in this example). Failure to do so will ignore the last desired skip point! If you want to insert chapters at precise individual scene changes use Cuttermaran to find out the respective frame numbers and put them into CellTimes.txt. You could subtract 3 or 4 frames from the actual scene change frame number to compensate for playback delay of some DVD players when jumping to a chapter.

Step 4a - remux using IfoEdit (VOB authoring)

The remux process (re-interleaving of separated video and audio streams) which results in burnable VOB files is accomplished with IfoEdit.

- 1) run IfoEdit
- 2) choose AUTHOR NEW DVD in the DVD AUTHOR menu
- 3) load the demuxed m2v video stream of your movie into the line called "Video"

- 4) load the demuxed mpa audio stream of your movie into the field called "Audio" (you could add multiple audio streams of the same length here for a multilanguage DVD)
- 5) load CellTimes.txt into the line "SCENE CHANGES / CHAPTERS"
- 6) define an output path in the line "Destination"
- 7) click OK, lfoEdit will take some time to do its job

Step 4b - joining VOBs using VobEdit

(only applies to the case where your movie had been recorded into several portions that have to be authored separately)

It's highly recommended to avoid this process by using Cutterman to merge multiple video parts. However, in case it is necessary follow these instructions:

- 1) Only keep VOBs created by lfoEdit, erase all IFOs and BUPs
- 2) rename VTS_01_1.VOB to VTS_01_001.VOB (in case there is more than one VOB rename them all to VTS_01_001.VOB ... VTS_01_xxx.VOB)
- 3) copy all VOBs that make up the movie into the folder where VTS_01_001.VOB is located (giving you a set of VOB files going from VTS_01_001.VOB to VTS_01_xxx.VOB)

From these VOBs you create a continuous VOB set using VobEdit. VobEdit begins with the first VOB (VTS_01_001.VOB) writing its data to a new VOB file named VTS_01_1.VOB (be sure to redirect it to a new folder (!), preferably on a second hard drive to speed up the process). As long as the 1-GB-limit is not reached data from other VOBs is also written into the new file. As soon as VTS_01_1.VOB has a size of 1 GB, VobEdit starts a new VOB file (VTS_01_2.VOB) and so on. Subsequently created VOBs will play seamlessly on your standalone DVD player.

- 4) run VobEdit
- 5) click "OPEN" (left bottom of window) and load VTS_01_001.VOB
- 6) choose "JOIN CLIPS" in the "EDIT" menu
- 7) VobEdit prompts for a destination for the joined VOB set (the first file will be automatically named VTS_01_1.VOB)
- 8) VobEdit prompts for a VOB-ID, confirm the "1"

VobEdit begins to join the VOBs. You end up with a new set of joined VOBs named like this: VTS_01_1.VOB to VTS_01_x.VOB.

To recreate the missing IFOs and BUPs start lfoEdit and click on CREATE IFOs. Choose the first VOB and check SAME AS SOURCE. Click OK to let lfoEdit create the files. The movie is now ready to be burned on a DVD.

Step 4 - burning a DVD

Unfortunately, it is not possible to burn a folder containing DVD material right away as a "DVD Rom" project. You have to use a program capable of burning DVDs and offering a DVD video burning template. In contrast to "normal" data- or audio-burning which is made in ISO/Joliet format, video DVDs have to be written in UDF format. Furthermore, a DVD player expects the IFO- and VOB-files to be located at special addresses and in a special order on the DVD. It's not enough to put all prepared DVD content into a self-made VIDEO_TS folder and burn it all as a DVD Rom! In this case the DVD would not play back in a standalone player.

However, choosing "DVD Video" from the burning program's templates will make the program respect DVD file allocation and order during the burn process.

DVD with 2 languages (2 independent audio tracks)

As long as it is not easily possible to record a film with two different audio tracks right away, one has to look for a workaround. For instance, you could record a film twice (on some TV stations films are repeated after a few hours or days). Each time you record it choosing a different audio track. Afterwards, one has to make the two audio tracks start synchronously and cut them to an equal length.

Once accomplished, you can mux the video data together with the two audio tracks in IfoEdit. You can then toggle between tracks via the remote control of your DVD player.

If you're in need of further advice concerning this issue please write an email. At the moment I'm working on an help file.

In the rare case that a TV station transmits a film with one language on the left audio channel and another language on the right audio channel you can obviously record both languages at the same time. Now it will depend on the options of your DVD player and your television set if you will be able to toggle between the two tracks or not. Some devices will interpret the two tracks as one stereo track so you will be hearing both tracks simultaneously (which off course is not acceptable).

To solve the problem, open the two channel audio track in an audio editing program and create new stereo files from either of the two channels (for example Terminator de.mpa and Terminator en.mpa). Be sure to save the files in the following format: MPEG1 layer 2 with 192 kbps stereo. Then, mux them with the video stream.

Basic DV3 info

- way of transmission: DVB-S (digital video broadcasting by satellite)
- video transmission format: MPEG2
- picture dimensions: 720x576 Pixel (=full D1), sometimes 480x576, other formats possible
- picture frequency: 25 frames/s
- aspect ratio: 4:3 or 16:9

- average DVB data rate: appr. 400 kB/s (outstanding: 3sat's data rate average is 700 kB/s and reaches real DVD picture quality; even with the most demanding picture content there are no perceptible artefacts (rasterization). Bad: those 20 TV stations of the ARD bouquet who have to divide the data capacity of a single transponder between them. This means that each station gets a quite small average amount of 300 kB/s, which is far too low especially for sports events. There you'll only get bad VHS quality. BTW: DVB-T, which is the new terrestrial digital television standard, is said to reach a maximum data rate of only 250 kB/s!

- audio format: MPEG1 layer 2, mostly 192 kbps stereo, sometimes 192 kbps AC3 Dolby Stereo (ZDF, 3sat, SAT.1, Pro7, Premiere) or AC3 5.1 Dolby Surround (6 audio channels) with 448 kbps (3sat, SAT.1, Pro7, Kabel1, Premiere). Rarely available: 192 kbps 2-channel audio (for example left channel German, right channel English or narrator)